

HIGH POWER DENSITY INSULATED METAL SUBSTRATE BASED POWER CONVERTER ASSEMBLY WITH VERY LOW BUS IMPEDANCE

Abstract

The invention is an electromechanical packaging method for high power, high reliability, high frequency, switch mode power converters where high power density is required. An Insulated Metal Substrate (IMS) Printed Circuit Board (PCB) assembly, with a plurality of surface mount semiconductor power devices, is interfaced to a heatsink. Low profile bus bars are used between the IMS PCB and a fiberglass PCB. The fiberglass PCB has a laminated DC bus structure and a plurality of filter capacitors electrically connected across the DC bus structure. Clamp bars, substantially following the footprint of the bus bars, are installed on top of the fiberglass PCB and are used to pull the heatsink-IMS-bus bar-fiberglass PCB-clamp bar sandwich together. The clamping action provides low contact resistance between the bus bars and the two printed circuit boards. The clamping action also supplies the pressure needed between the IMS substrate and the heatsink for good heat transfer across this interface. The assembly also provides a robust mechanical mounting method for the bus bars and printed circuit boards. The geometry and layout of the bus bars provides a connection from the IMS PCB to the fiberglass PCB with very low parasitic inductance between the surface mounted semiconductor power devices and the filter capacitors on the fiberglass PCB.